

APPENDIX A

ABSTRACT

Generally, the present invention provides a variable thickness gate oxide anti-fuse transistor device that can be employed in a non-volatile, one-time-programmable (OTP) memory array application. The anti-fuse transistor can be fabricated with standard CMOS technology, and is configured as a standard transistor element having a source diffusion, gate oxide, polysilicon gate and optional drain diffusion. The variable gate oxide underneath the polysilicon gate consists of a thick gate oxide region and a thin gate oxide region, where the thin gate oxide region acts as a localized breakdown voltage zone. A conductive channel between the polysilicon gate and the channel region can be formed in the localized breakdown voltage zone during a programming operation. In a memory array application, a wordline read current applied to the polysilicon gate can be sensed through a bitline connected to the source diffusion, via the channel of the anti-fuse transistor. More specifically, the present invention provides an effective method for utilizing split channel MOS structures as an anti-fuse cell suitable for OTP memories.